DETAILED ACTION

1. This is a second action on the merits. Claims 1-10, 12-36, and 38-39 are pending. Claims 11 and 37 have been cancelled.

Claim Objections

2. Objections to claims 1-39 due to minor informalities are lifted in view of the amended claims.

Drawings

3. Applicant states that two sheets of replacement drawings have been submitted. However, these drawings have not been received by the office. Applicant is encouraged to resubmit the replacement drawings.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-10 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (US Patent No. 6394796) in view of Eich (US Patent No. 4712014) and Koren (US Patent No. 6567162).

4. Regarding claim 1, Smith describes an apparatus (**oven 100**) comprising a emitter (**radiant heaters 120a-f**) that generate electromagnetic radiation; a conveying system (**assembly line**, **central rail 116**) that transports the object into the vicinity of and emitter (**120a-f**) (Smith : col 55, lines 17-24, 31-37, and Fig. 1). Smith states that the emitters are preferentially configured to match the shape of the object (Smith : col 2, lines 23-28), but does not describe a control device by which the orientation of the emitter (**120a-f**) can be automatically adapted to the contours of the object. However, Feroce describes a paint curing station in which a profiling sensor (**ultrasonic sensor**) can measure the contours of an object and adjust the position of emitters (**heating panels 18**, **19**) accordingly using a control device (**sensor**, **software**, **computer memory**) (Feroce, col. 2, lines 2-10). Feroce further teaches that the use of such a control system improves the uniformity of the emitting operation and minimizes the energy spent (Feroce: col. 1, lines 22-48). One of ordinary skill in the art at the time of the invention, motivated by a need to expose an object to an emitter in a uniform and cost-efficient way would have found it *prima facie* obvious to make use of the control system taught in Feroce in the apparatus of Smith . While neither Smith nor Feroce specifically discloses the use of a motor, Eich teaches the use of a motor (**motor 12**) to change the position of an emitter (**lamp 9**, **10**) (Eich: col 1, line 60 to col 2, line 24). One of ordinary skill in the art at the time of the invention, motivated by a need to move the

mirror, would have found it obvious to make use of a motor as a positioning means for the emitters in the apparatus of Smith in view of Feroce.

5. Further regarding claim 1, Smith in view of Feroce and Eich differs slightly from the claimed invention in that Feroce teaches a system in which the sensors are located at the processing station and that the coating object, such that the object makes an initial measurement pass through the system, and then makes a second pass through the system once the emitters are in place (Feroce: col 2, lines 2-6, and the abstract). However, Koren teaches a measuring system comprising sensors (**electro-optical devices 114**, **sensors 116**) that measure the profile of an object, communicate with a processing control system (**PLC 184**) and are arranged around a conveyor (**conveyor line 102**) (Koren: col 4, lines 57-62, col 7, lines 45-51). Koren further teaches that said sensors (**114**, **116**) can be located at multiple positions about the conveyor line (**102**) at different stages of a manufacturing process (Koren: col 2, lines 3-16). The transport direction of the object does not change during the measuring process of Koren. Koren teaches that such a measuring system can be easily reconfigured to inspect a different type of object, or moved to a different position on the conveyor line (Koren: col 2, lines 48-61). One of ordinary skill in the art at the time of the invention, motivated by a need to easily reconfigure the measuring system in the apparatus of Smith in view of Feroce and Eich would therefore have found it *prima facie* obvious to make use of the measuring system of Koren with a reasonable expectation of success.

6. Regarding claim 2, Smith in view of Feroce, Eich, and Koren discloses an apparatus **(oven 100**) in which a first emitter (**radiant heater 120b**) extends within a

plane that runs substantially parallel to a transporting plane of the conveying system (**116**), and the first emitter (**120b**) can be driven by a motor in a direction perpendicular to the transporting plane (Smith : col. 5, lines 38-67 and Fig. 1).

7. Regarding claim 3, Smith in view of Feroce, Eich, and Koren discloses an apparatus (**100**) comprising two further emitters (**radiant heater 120a-f**) that are arranged on both sides of a conveying stretch (**assembly line**, **central rail 116**) (Smith: col 5, lines 31-37 and Fig. 1).

8. Regarding claim 4, Smith in view of Feroce, Eich, and Koren discloses two further emitters (**radiant heaters 120a- f**) that can be driven by a motor in directions perpendicular to a conveying direction of the conveying system (Smith : col. 5, lines 45-56 and Fig. 1).

9. Regarding claim 5, Smith in view of Feroce, Eich, and Koren discloses two further emitters that can be driven by a motor in directions perpendicular to a conveying direction of the conveying system (Smith : column 5, lines 38-67 and Fig. 1).

10. Regarding claim 6, Smith in view of Feroce, Eich, and Koren discloses an apparatus (**oven 100**) in which emitters (**radiant heater 120a-f**) are secured to a frame (**support bar 118**) that spans a conveying stretch (**central rail 116**), but does not specifically describe a gantry-like support system (Smith : col. 5, lines 38-45 and Fig. 5). However, positioning the emitters in a frame in a bridge-like gantry would represent a mere rearrangement of parts, and would not distinguish the instant application from the prior art in a patentably distinct way (See MPEP 2144.04).

11. Regarding claim 7, Smith in view of Feroce, Eich, and Koren discloses an apparatus (**100**) comprising an emitter (**radiant heater 120a-f**) whose spatial orientation can be altered (Smith: col. 5, lines 38-67 and Fig. 1) and in which a control device (**sensor**, **software**, **computer memory** of Feroce) can measure the contours of an object and adjust the position of emitters (**heating panels 18**, **19**) accordingly (Feroce, col. 2, lines 2-10).

12. Regarding claim 8, the apparatus of Smith in view of Feroce, Eich, and Koren comprises a control system associated with sensors (**sensor**, **software**, **computer memory** of Feroce) that is capable of keeping the intensity of radiation per unit area of the object above a threshold value (Feroce: col. 3, line 40-co1.4, lines 2). Note that the manner of using an apparatus in an apparatus claim does not distinguish the claimed invention above the prior art so long as the prior art apparatus is capable of being operated in the same way (see MPEP 2114).

13. Regarding claim 9, the control device of Smith in view of Feroce, Eich, and Koren (**sensor, software**, **computer memory** of Feroce) is designed so that the amount of electromagnetic radiation incident per unit area on the material remains substantially constant (Feroce: col. 4, lines 3-21).

14. Regarding claim 10, the control device of Smith in view of Feroce, Eich, and Koren comprises a memory (**computer memory**) (Feroce: col. 2, lines 2-10).

15. Regarding claims 33-35, Smith in view of Feroce, Eich, and Koren discloses a zone (**oven 100**) that is capable of being used a preheating zone for removing solvent

of gelling pulverulent material, or as a post-heating zone for hardening (Smith: co1.8, lines 5-14).

16. **Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Feroce, Eich, and Koren as applied to claims 1-10 and 33-35 above, and further in view of Bramm (US 4763032).**

17. Regarding claim 12, Smith in view of Feroce, Eich, and Koren discloses an ultrasonic sensor rather than a light barrier (Feroce: col.3, lines 52-53). However, it was known in the art at the time of the invention that a light barrier sensor can perform a position-detection function equivalent to that of an ultrasonic sensor, as evidenced by Bramm, which states that the sensors used in a position-sensing application are "preferably wither infrared light barriers or ultrasonic barriers." (Bramm: col.7, lines 36-40 and col.8, lines 9-21). The use of a light barrier sensor instead of a ultrasonic sensor therefore represents an art-recognized equivalent used for the same function, and does not distinguish the instant application from the prior art in a patentably distinct way (see MPEP 2144.06).

18. **Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Feroce, Eich, and Koren as applied to claims 1-10 and 33-35 above, and in further light of Powell (US Patent No. 4958306).**

19. Regarding claims 13 and 14, Smith in view of Feroce, Eich, and Koren teaches an ultrasonic sensor rather than a light barrier (Feroce: col. 3, lines 52-53). However, it was known in the art at the time of the invention that either a video camera or an optical sensor can perform a dimensional metrology function that is equivalent to that

performed by the ultrasonic sensor of Feroce. As an example, Powell teaches the use of ultrasonic sensors to measure the height profile of a surface, and also teaches that video cameras can also be used to perform the same task (Powell: co1.1, lines 50-65, and col. 2, lines 7-19). The use of a video camera instead of a ultrasonic sensor therefore represents an art-recognized equivalent used for the same function, that does not distinguish the instant application from the prior art in a patentably distinct way (see MPEP 2144.06).

20. In further regard to claim 13, Feroce discloses a computer memory and software associated with the ultrasonic sensor (Feroce: col.2, lines 2-10), and would therefore have been able to perform a digital image recognition function. Note that the manner of operating an apparatus does not distinguish an apparatus claim from the prior art (see MPEP 2114).

21. **Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Feroce, Eich, and Koren as applied to claims 1-10 and 33-35 above, and in further light of Bauer (US Patent No. 5871236).**

22. Regarding claim 15, Smith in view of Feroce, Eich, and Koren discloses an ultrasonic sensor rather than an optical scanner comprising an infrared light source (Feroce: col. 3, lines 52-53). However, it was known in the art at the time of the invention that an optical scanner comprising an infrared light source can perform a position-detection function equivalent to that of an ultrasonic sensor. Bauer teaches that both ultrasonic and infrared sensors can be used to measure the position of an object (Bauer: co1.5, lines 4-13). The use of an infrared sensor instead of a ultrasonic sensor

therefore represents an art-recognized equivalent used for the same function, and does not distinguish the instant application from the prior art in a patentably distinct way (see MPEP 2144.06).

23. **Claims 16-21, 24, 27-30, 32, 36, and 38-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Feroce, Eich, and Koren as applied to claims 1-10 and 33-35 above, and further in view of (Bubley US Patent No. 4646446) and Coleman (US Patent No. 3790801).**

24. Regarding claim 16, Smith in view of Feroce, Eich, and Koren teaches a housing (**oven 100**) into which an object can be introduced and an emitter (**radiant heaters 120a-f**) (Smith: col.5, lines 18-37), but does not disclose a housing that is gas-tight and impermeable to electromagnetic radiation. However, Bubley describes a UV curing station with a housing (**housing 15**) into which an object can be placed, an emitter (**UV bulb**), and a light shield (**22**) and reflector (**18**) that renders the housing impermeable to electromagnetic radiation (Bubley: col. 2, lines 29-37, 56-55, and Fig. 3). Bubley further teaches that UV light is harmful to human eyes (Bubley: col. 2, lines 61-65). One of ordinary skill in the art at the time of the invention, motivated, by a need to avoid injuring workers near the curing facility, would have found it obvious to place the light shield of Bubley into the housing of Smith in view of Feroce, Eich, and Koren, with the reasonable expectation that such a shield would prevent UV rays from harming nearby workers.

25. Further regarding claim 16, Smith in view of Feroce, Eich, and Koren does not specifically disclose an apparatus that is gas-tight. However, Coleman discloses a

curing station with an emitter that is gas-tight (Coleman: col. 6, lines 1-12). Coleman further teaches that the composition of gas inside the housing (**chamber 1**, **10**) of a curing station can affect the rate of curing reactions, and that toxic byproducts such as ozone are often produced during the curing process (Coleman: col. 1, lines 34-54). One of ordinary skill in the art at the time of the invention, motivated by a need to prevent toxic gases from escaping from a curing booth, and also to control the rate of reactions occurring inside the booth, would have found it obvious to incorporate Coleman's gas-tight housing in the apparatus of Smith in view of Feroce, Eich, and Koren.

26. Regarding claims 17-19, the use of Coleman's gas-tight chamber in the apparatus of Smith in view of Feroce, Eich, and Koren would allow for a protective gas to be fed into the interior (**chamber 1**, **10**) (Coleman: col. 2, lines 35-54). Said gas could be heavier or lighter than air.

27. Regarding claim 20, Coleman discloses an inlet (**gas distribution tube 13**) for gas provided in the immediate vicinity of an emitter (**lamp 2**) (Coleman: column 2, lines 35-54 and Fig. 2). The use of Coleman's gas-tight chamber in the apparatus of Smith in view of Feroce, Eich, and Koren would therefore meet the limitations of claim 20.

28. Regarding claim 21, the housing (**oven 100**) is covered with a reflecting layer (**steel**) in the vicinity of an emitter (**radiant heater 120a-f**) (Smith: col. 5, lines 10-11).

29. Regarding claim 24, Coleman discloses a container (**inner chamber 10**) open to a transporting plane (**openings 11**, **11'**) arranged within the housing (**outer chamber 1**) that can be filled with a protective gas (Coleman, column 2, lines 35-54).

30. Regarding claim 27, Coleman discloses a housing in which a device (**gas distribution tubes 13**) is provided for removing oxygen from the atmosphere contained within the housing (Coleman: co1.2, lines 16-25 and col. 2 lines 59-63).

31. Regarding claim 28, Coleman teaches that removing oxygen from the atmosphere in the housing is advantageous because it prevents hazardous gases from forming during the curing process and also allows for more precise control over some curing reactions (Coleman: col. 1, lines 39-44). Coleman further discloses a means of removing oxygen from the oxygen from the housing by introducing an inert purging gas (Coleman: col. 2, lines 16-25). One of ordinary skill in the art at the time of the invention, needing to reduce the formation of hazardous gases, would have found it *prima faice* obvious to incorporate the oxygen removal means of Coleman into the housing of Smith in view of Feroce, Eich, and Koren.

32. Regarding claims 29-30, Coleman teaches a means of removing oxygen from the oxygen from the housing by introducing an inert purging gas (Coleman: col. 2, lines 16-25), but does not disclose the use of catalytic binding, filters that absorb oxygen, or filters that adsorb oxygen. However, the use of such alternate means of oxygen removal would represent the substitution of art- recognized equivalents for the same purpose, and would therefore fail to distinguish the instant application above the prior art in a patentably distinct way (see MPEP 2144.06).

33. Regarding claim 32, Smith in view of Feroce, Eich, and Koren teaches a moveable reflector (**aluminum sheet 47**) associated with an emitter (**heating panel 15**, **17**, **18**) on the side facing away from the object (Feroce: co1.3, lines 15-26 and Fig. 5).

34. Regarding claim 36, Smith in view of Feroce, Eich, and Koren teaches the use of emitters (**radiant heaters**), but does not specify what wavelength of radiation is emitted. However, the use of UV lamps to photocure coatings is well known in the art, as is taught in Coleman (Coleman: co1.1, lines 15-27). One of ordinary skill in the art at the time of the invention, motivated by a need to cure an object with a UV-curable coating, would have found it *prima facie* obvious to incorporate the UV lamps of Coleman into the curing apparatus of Smith.

35. Regarding claims 38-39, Coleman describes the use of nitrogen as a purge gas, but does not disclose the use of carbon dioxide or helium. However, the use of such alternative purge gases would represent the substitution of art-recognized equivalents for the same purpose, and would therefore fail to distinguish the instant application above the prior art in a patentably distinct way (see MPEP 2144.06).

36. **Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Feroce, Eich, and Koren as applied to claims 1-10 and 33-35 above, and further in view of Uesaki (US Patent No. 4928040).**

37. Regarding claim 31, Smith in view of Feroce, Eich, and Koren discloses an emitter (**radiant heaters 120a-f**) (Smith: col. 5, lines 18-37), but does lacks use of a reflector whose shape can be altered to change the incoming radiation. However, such reflectors are well-known in the art, as disclosed by Uesaki, which describes a reflector (**100**) that "can be formed in another shapes freely in accordance with the desired directions or configurations of the rays to be reflected." (Uesaki: column 3, lines 10-17).

38. One of ordinary skill in the art at the time of the invention, motivated by a desire to control the distribution of radiation in the curing booth for more uniform curing would therefore have found it *prima facie* obvious to add the flexible reflectors of Uesaki to the apparatus of Smith in view of Feroce, Eich, and Koren.

39. **Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Feroce, Eich, Koren, Bubley, and Coleman, as applied to claims 16-21, 24, 27-30, 32, 36, and 38-39 above, and further in light of Terashi (US Patent No. 5532043) and Davenport (US Patent No. 5101325).**

40. Regarding claims 22 and 23, Smith in view of Feroce, Eich, Koren, Bubley, and Coleman teaches the use of a reflecting layer, but does not specify an uneven layer or a layer including aluminum foil (Smith: col. 5, lines 10-11). However, it was known in the art at the time of the invention that an uneven metal foil provides a diffuse reflection of light (Terashi: col.2, lines 1-4). Furthermore, it was known that a chamber with a diffusely reflecting surface allows for the uniform illumination of an object (Davenport: col.2, line 55-col. 3, lines 15). One of ordinary skill in the art at the time of the invention, motivated by a desire to uniformly cure objects in a curing station would have found it obvious to use the uneven aluminum foil layer of Terashi as a reflecting layer in the invention of Smith in view of Feroce, Eich, Koren, Bubley, and Coleman, with the reasonable expectation that such a layer would provide a diffuse reflection and uniformly illuminate the objects in the station.

41. **Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Feroce, Eich, Koren, Bubley, and Coleman, as applied to**

claims 16-21, 24, 27-30, 32, 36, and 38-39 above, and further in view of Folsom (US Patent No. 4111753).

42. Regarding claim 25, Smith in view of Feroce, Eich, Koren, Bubley, and Coleman discloses housing that meets the limitations of claim 16, but does not disclose a housing with a lock for introducing and removing an object at the inlet or outlet of a chamber. However, the use of such a lock to introduce samples is known in the art, as demonstrated by Folsom, which discloses a lock (**airlock**) such that objects can be introduced into an adjoining housing (**chamber**) (Folsom: column 3, lines 61-68). Folsom teaches that such a lock enables objects to be introduced without exposing the housing to the surrounding atmosphere (Folsom: column 3, lines 61-68). One of ordinary skill in the art at the time of the invention would have found it obvious to add the locks of Folsom to the housing of Smith, with the expected result that such an addition would allow for objects to be introduced into the housing while maintaining a reduced oxygen level inside the housing.

43. Regarding claim 26, the lock of Folsom comprises an inlet for protective gas (**gas inlet 124**) within the entry lock such that a cavity present in the object could be flushed out with a protective gas.

Response to Arguments

44. Applicant argues that the Feroce, which describes a sensor system located in a hardening device in which the object passes through the sensor array twice, fails to meet the amended claim, which requires a sensor system located upstream from

hardening device and that the object not change its travel direction. This new limitation is met by the prior art of Koren, as described in detail in paragraph 4 above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert Hilton whose telephone number is (571)-270-5519. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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